

Using the substitution
 $x = 3 \sec(u)$ find the exact
value of $\int_3^4 \frac{1}{x^2 \sqrt{x^2 - 9}} dx$

Find $\int (\sec(x) + \tan(x))^2 dx$

What is $\int \sin^3(x) dx$?

Find $\int (2x + 5)e^{4x^2+20x} dx$

Show that

$$\int e^{2x} \sin(x) dx = ae^{2x} (\cos(x) - 2 \sin(x)) dx$$

where a is a fraction to be
found.

Find in the form $\ln\left(\frac{a}{b}\right)$,
 $a, b \in \mathbb{Z}$,
 $\int_2^5 \frac{3x + 12}{x^2 + 7x + 10} dx$

Beryl claims that the following
are all true:

$$\int \sin(x)\cos(x) dx = \frac{1}{2} \sin^2(x) + C$$

$$\int \sin(x)\cos(x) dx = -\frac{1}{2} \cos^2(x) + C$$

$$\int \sin(x)\cos(x) dx = -\frac{1}{4} \cos(2x) + C$$

Is she correct? Fully justify your
answer.

Find $\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \cos^2(x) dx$

$$\int \frac{e^{\sqrt{x-1}}}{\sqrt{x-1}} dx$$

$$\int_1^3 2x\sqrt{3x^2+4} dx$$

Prove that
 $\int \ln(x) dx = x \ln(x) - x + C$

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Maths
MATHEMATICS EDUCATION EXPERT

Year 13
Integration

Find the area between the
curve $y = x^2 - 6x + 3$ and the
line $y = 2x + 3$